

Amendments to the Specification:

Please amend the specification as follows:

Please replace paragraph numbers [0038] and [0039] with the following rewritten paragraphs:

[0038] A preferred apparatus for producing colloidal nanoparticles in a dense medium is illustrated generally in Figure 1. The apparatus of Figure 1 includes a DC power supply 1, an evacuation tube 2 for gasses, a coolant exit tube 3 and an inlet tube 26, outer and inner glass cylinders 4 and 7 which form part of the chamber for the reaction vessel, an electrical brush contactor 5, and coolant 6 which is enclosed within the volume defined between the outer glass cylinder 4 and the inner glass cylinder 7. An upper electrode 19 may include an end piece 8 having an array of conductive pins 23 in a ceramic holder. The chamber of the reaction vessel is further enclosed by a lower end cap 9 and an upper end cap 17 which are engaged with the glass cylinders 4 and 7 to form an enclosed space for the coolant 6 and an inner chamber defining the reaction vessel. The lower electrode 10 is a non-rotating electrode and is mounted with its end piece adjacent to the end piece of the upper electrode. The lower electrode 10 is electrically connected to a ground 11. A gas inlet tube 12 formed through the lower electrode allows introduction of gas through the electrode into the gas space between the planar faces of the end pieces of the upper and lower electrodes. A motor 13, e.g., an electric motor, hydraulic motor, etc. is controlled by a controller 14 (e.g., digital motor controller) and is coupled via magnetic couplers 15 and 18, which form a magnetic coupling system to the rotating upper electrode ~~19~~17. The electrode 19 is conductive to conduct power from the power supply 1, as transferred thereto by the brush 5, to the electrically conductive end piece 8 and the pins mounted thereon. The dense medium is supplied to the reaction vessel through an inlet tube 16. A quartz enclosure 21 is mounted to the upper electrode as an isolator to isolate the conductive shaft ~~19~~ of the upper electrode 19 within an enclosed space 20 and seal it off from the liquid medium within the reaction vessel. A recirculating pump 22 is connected in the inlet tube 16 to drive recirculation

of the liquid medium from the bottom of the chamber of the reaction vessel to the top. The pins 23 are mounted in the planar surface of the end piece 8 of the upper electrode and, preferably in a spiral pattern array as discussed further below, and are formed of an electrically conductive material such that electrical discharges (shown for illustration at 24 in Fig. 1) occur between the pins and the adjacent planar surface of the end piece of the lower electrode. Channels or conduits 25 are formed in the end piece of the lower electrode to allow recirculation of fluid through the end piece into the space between the upper and lower electrodes. A valve 27 is connected to the supply line 16 to allow discharge of the fluid medium within the chamber after treatment has been completed.

[0039] As noted above, the reactor of Figure 1 is composed of a cylindrical glass chamber 7, which functions as the reaction vessel, provided with two, stainless steel, upper and bottom caps 9, 17, and a cooling jacket 4. The rotating, cylindrical stainless steel, upper electrode 19 is equipped with the quartz jacket 21 for avoiding the penetration of the reaction media to the electrode sustaining central shaft and bearings. The upper electrode has a cylindrically-shaped, disc cross-section end piece 8, which is terminated in an interchangeable ceramic pin-array holder 829 for the pins 23. Preferably, the pins are spirally located in the pin-array. As used herein, "pin" refers to any type or shape of protuberance extending from the face of the end piece of the electrode. The lower electrode is hollow, and has also an interchangeable conical cross-section end piece, and in addition it is provided with channels 25 for the recirculation of the reaction media. Both the pin-array and the interchangeable metallic part of the lower electrode may be made of various conductive materials, including pure silver. The distance between the pin-array and the lower electrode can conveniently be modified by a micrometric (thimble) screw-system. A typical gap distance is at least about 0.2, preferably at least about 0.5 mm, up to about 3, preferably up to about 1 mm. The distance is selected according to the dielectric constant of the liquid medium. The reactor is vacuum-tight and the rotation of the upper electrode is assured through a magnetic coupling system 15, 18 that couples a motor 13 (e.g., an electric motor, hydraulic motor, etc.) to the upper electrode 19 to selectively drive it in rotation. The reactor can be operated in a batch-type or continuous-flow modes, depending on the specific application. Reactive or inert gases can also be introduced into the

dense medium during the plasma processes through the hollow lower electrode. These gases provide bubbles within the planar gap between the electrodes, thereby facilitating the plasma reaction. The rotation of the upper electrode is digitally controllable in the range of 0-5,000 rpm. The rotation of the upper electrode causes further bubble formation through cavitation of the liquid medium. The bubble formation (cavitation) is very important to the efficiency of the dense medium reactor in that the bubbles render a volume-reaction (i.e., the reaction occurs within the volume of the bubble) rather than an interphase reaction.